business topics

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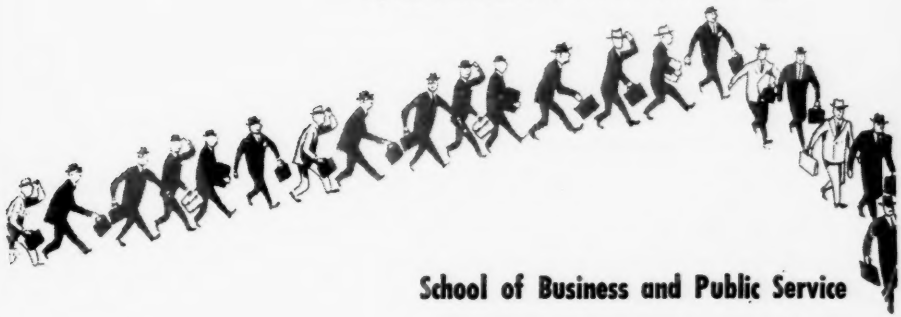

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THE CURRICULUM IN FOOD DISTRIBUTION, the only one of its kind in the nation, was inaugurated by the School of Business and Public Service in September, 1950 under the sponsorship of the National Association of Food Chains with a grant of $87,500. The curriculum, a new industry-education cooperative venture, combines many areas of study in agriculture, business administration and other courses related to the food field.

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Job opportunities for the men who have completed the curriculum are numerous and the pay is very good. Without exception the food chains are planning very attractive futures as executives in the industry for their graduates from the program. The program needs more young men to enroll and become eligible for the many job opportunities awaiting its graduates. (See page 20.)

business topics

Vol. I September, 1953 No. 2

"Let your discourse with men of business be short and comprehensive."

(George Washington's *Copybook*).

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AIR TRANSPORTATION AND THE FUTURE

*By J. H. ("Slim") CARMICHAEL**

In the opinion of the writer Michigan can claim the first scheduled air transport service. The history of any movement that grows with the fantastic speed of aviation is bound to be debatable, and other states may assert a claim to this distinction, but the old operation conducted by Bill Stout between Detroit and Grand Rapids, back in 1926, provided the first demonstration of what airline operations could and should be. This was certainly the first time that anyone, in the face of odds that seemed insurmountable, proved that a regular scheduled operation could be conducted day in, day out, on into the future. He proved that the airplane could not only function as a public convenience, answering to a need, but could also show a profit. His old single-engined Ford was succeeded by the tri-motored Ford. Some of this same vintage are still being used with great success. Even today they are making a name for themselves in Latin America.

Where Aviation Stands Today

It took a tremendous amount of foresight and vision to establish the groundwork for what was to become one of the finest forms of transportation. Though fifty years of aviation have changed our environment so much, we have hardly scratched the surface of its possibilities. Consider where we stand today: right now the aviation industry is the second largest industrial employer in the nation. We are turning out some thousand planes or so every month; our air transportation system is beyond question the finest in the world; our private flying is perhaps more comprehensive than any other nation, and its utility is demonstrated in the Civil Air Patrol. Our position of air leadership compares to Britain's maritime supremacy in the nineteenth century. Yet, as I say, we stand at the very beginning of the air age. The fifty years just past, progressive though they were, represented only a period of preparation.

We are, then, still crossing a threshold. This is no time to think we have arrived, or to look back more than briefly. The real challenge lies ahead. The era before us extends beyond the scope of our imagination. The growth of the last decade of air transport exceeded the most fantastic estimates, and the next decade will continue at the same rate, in all likelihood. The corollary to unexpected development is unexpected problems. Aviation is going to mean more to this country than our minds can grasp at present: All of the optimism and determination in the world are not going to be enough. What we need more and more from now on is sound thinking, logical planning. In the past, it took practical realism to put the vision of our pioneers of the air into operation, and it will take a realistic philosophy

*Mr. Carmichael is President of Capital Airlines, Incorporated. He has been in the aviation industry for twenty-eight years—nearly all with Capital Airlines and its predecessor companies. Starting as a pilot, he rose to head this system five years ago, and hence he speaks with authority. This is an adaptation of his address before the Michigan Aeronautics Conference at East Lansing on May 28.

to continue the rate of progress we owe to our pioneers.

Thinking Ahead for Aviation

The Michigan Aeronautics Conference is an excellent aid to this progress. It is a continued education program for the intelligent analysis of the place of aviation in our national and local economy. It is basic for us to think constantly of our field of commercial aviation in relation to each of our fellow citizens. If we can widen the coverage of this type of program we will do more to foster aviation than anything that has been done to date. We have to think of commercial aviation in terms of the fifteen-sixteenths of our population who have never flown. (This outstanding figure is quoted on the authority of Keith Saunders of the American Aviation Magazine.)

It is amazing to couple this disturbing figure with the fact that domestic planes, last year, carried more first class passengers than the railroads. This means that most of the flying is being done by the same group of people, and that we have not yet approached the mass market. The growth we must look for, in view of these statistics, will be in the area of new business. We have a real responsibility to bring into realization the vast potential of air transport.

As never before, intelligence must guide the expansion of the aeronautical field. We are likely to think too much of our impressive accomplishments here and not enough of the problems still to be settled. Airways, airports, navigation facilities: there is no end to the headaches involved in expansion. The price of unintelligence is likely to be extravagance. We have to provide for changing needs, perform our admired function as a vital secondary arm of national defense—and stay solvent. Realistic appraisal of the actual need, and the judicious expenditure of money have to be foremost in our policies.

A word about jet transports will illustrate this need for realistic thinking. "Jet operation is just around the corner". This remark is frequently heard these days. How true is such a statement? Of course the jet is gaining in commercial as well as military importance, but let us see whether we can really look for its rapid superseding of the piston-type plane. Consider the rate of progress of adoption of any commercial plane. We did not get full steam up until the DC-3 came into operation. This model came out in 1936 or 1937, and it took years for any other model to replace it, one that could satisfy the needs of the public and still meet the requirements of the operator. Our present planes, the finest in the world for our transport purposes, are the result of the gradual development of years. Only slow, steady, comprehensive progress will bring about the next step, whether it be jets, turbo-props, or something still unheard of. Headlong change will be unsatisfactory to the public and economically disastrous for the operators.

"But the British are operating jets," continues my imaginary objector. In my opinion there are factors present in their situation that are not present here. Their planes could not fly without their 100 per cent subsidy and the dogged British determination to recapture commercial prestige. On a short range, low pay load basis, such operations would be even less practical. It is terrifically costly per mile as a unit of equipment, to the point where no enterprise carrier could afford to operate it. To be sure, there is nothing about

the jet that isn't appealing—it flies high in smooth air, is quiet and fast, just what the public wants. But do they want it on a subsidized basis?

Aviation Industry's Responsibility

As I see our responsibility to the American people, it is to provide air transportation for all. Our people, according to the figures, want short-haul trips. The average length of a flight in the United States is four hundred miles. In 1952 Capital, one of the shortest haul carriers in the business, carried over two million passengers. Certainly Detroit to London sounds romantic, but Detroit to Chicago is much more practical. For the one person who wants to fly to London there are thousands who want to go to Chicago, and I think it is our responsibility to fill that need before we make projects about the other.

Whatever the next development may be, proper analysis of our purposes is paramount. The right sort of equipment, whether jet, turbo-prop or helicopter, will automatically suggest itself at the proper time.

How do the operators feel about helicopters? This type of plane has tremendous possibilities. Here again, the word is *not yet*. Though the Korean war meant greatly accelerated development in this field, here again we know it isn't practical at this time. Some of the manufacturers have designed and even built prototypes that promise economical operation in commercial short hauls. The aviation business is making haste slowly, for any use we make of new equipment must represent another sound step in our progress. Any advance we make commercially has to benefit aviation in general, not just air transportation. A helicopter could conceivably mean more business for a fixed-base operator; more planes operated by a fixed-base operator would mean more revenue for airports; this would mean lower costs, which lead to more flying —and it all makes for a general expansion of aviation.

In these days of cold warfare much of the emphasis in aviation has to be on its military importance. Eventually the real stress will be on peacetime use: its development as a major form of transportation. All carriers have a role to play in meeting the overall transportation need of our country. The sooner we realize this and stop beating our heads against each others' walls, the better. Railroads, steamship lines, buses, airplanes—the public needs them all. Our particular task is to serve that public in our own area of operation by planning ahead intelligently. Vision we must have, but tempered with wisdom. If we keep our own feet on the ground we'll get a good many more people in the air.

How Management Can Improve Its Listening Techniques

*By DALTON E. McFARLAND**

What engineer in a modern plant would hesitate to apply the latest scientific methods and available technical facilities through distrust of their reliability and effectiveness, or through lack of skill in handling them? Such a point of view would be a strange one; the wisdom of employing the best possible methods is self-apparent. Yet this situation is exactly paralleled in the reluctance of executives to make the fullest possible use of up-to-date listening techniques.

The flow of information from workers to supervisors and upward to higher levels has been the subject of careful study in recent years. More and more business men have been expressing a need for better ways of keeping in contact with their supervisors and workers. Nevertheless, newer methods of listening to employees are not widely used in industry, although they are practical and highly developed.

Managerial problems. To explain this paradox, one must first understand the forces contributing to the development of the techniques. Attitude surveys, grievance systems, interviewing, suggestion systems, etc., evolved out of a variety of managerial problems inherent in large-scale business enterprise. Relationships between people in large organizations often become excessively impersonal and formal. Individuals and their opinions may easily be submerged in systems and red tape. Managers may be forced to make decisions without having adequate information. It is difficult indeed to keep lines of communication open when people are working for an institution rather than directly for the owners of a business.

A New Philosophy

These conditions of large-scale enterprise, which are also reflected in smaller organizations because of the tendency for patterns of business management to become widely adopted, have affected workers as well as managements. In part, workers met the situation by organizing labor unions to influence management decisions. Management's solution, on the other hand, was a fundamental change in its operating philosophy, based on a new recognition that a business organization must serve the needs and goals of workers as well as management, owners, and the community. According to a leading personnel management textbook:

> It seems obvious that there is a trend in the direction of building personnel programs more and more in terms of labor's interests, labor's participation, and labor's characteristics.[1]

This same book defines personnel management as:

> . . . the activities of procuring, developing, maintaining and utilizing a labor force in order that the objectives and interests for which the company is established are attained as effectively and economically as possible, *and the objec-*

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1. Michael Jucius, *Personnel Management,* Chicago, R. D. Irwin Co., 1952, p. 14.

tives and interests of labor itself are served to the highest degree.[2]

If serving the interests and objectives of labor is recognized as a legitimate objective of personnel management, it becomes vitally important to determine what these interests and objectives are. Acceptance of this changed philosophy implies a need for opening up channels of information which will allow management to assess correctly what the workers expect from management and how they feel about their company and their jobs.

Reluctance to Use Available Techniques

In spite of a great deal of emphasis in business publications on the vital necessity for listening to employees, surveys and interviews with business men disclose that the potentialities of available techniques are not widely utilized. In Milwaukee, for example, a survey in 1948 indicated that only 15 per cent of the manufacturing concerns maintain suggestion systems.[3] In a 1952 survey of 300 Cleveland firms employing approximately 135,000 hourly-paid factory workers, only seven per cent, employing 15 per cent of the workers, used attitude surveys. In the same survey, of 287 firms employing about 45,000 white-collar workers, 8 per cent, employing 19 per cent of the workers, used attitude surveys.[4]

One recent study on the use of attitude surveys does report an increasing trend in their use. Of the companies investigated, 8 per cent were making such surveys in 1944, 14 per cent in 1946, and 22 per cent in 1948.[5] However, even this last percentage seems relatively low when it is considered in the light of the strong and constant emphasis on listening to employees.

Discussions with executives who have been participating in conference training programs confirm the conclusion suggested by the survey data that there exists a general reluctance to use available techniques for finding out what workers think. In an executive training conference conducted by the author, the vice-president of a firm employing over 3,000 workers asked how he could be sure of getting an accurate picture of what his workers were thinking. Analysis of his operating methods disclosed that he (1) distrusted the ability of his supervisors to relay information from workers, (2) did not believe that the union in his plant could be at all reliable or useful in communicating worker feeling, and (3) could see utterly no value in attitude surveys because "workers are not capable of expressing themselves through such devices." This executive recognized the need for better information, but flatly rejected the major ways of obtaining that information.

Why Management Hesitates

Three principal reasons can be cited for this reluctance to use available techniques:

First, it is undoubtedly true that not all executives have accepted the changed philosophy of management which acknowledges the importance of worker objectives. In other instances, acceptance may not be genuine or com-

2. Ibid, p. 18. The italics are the author's.

3. From unpublished data inspected by the author.

4. Associated Industries of Cleveland, *A Handbook of Applied Personnel Practices in Cleveland,* 1952, pp. 66 and 148.

5. S. Avery Raube, *Experience with Employee Attitude Surveys,* Studies in Personnel Policy, No. 115, New York, National Industrial Conference Board, Inc., 1951, p. 7.

plete. In such firms, a window-dressing of personnel techniques masks the real indifference of the management. As one personnel director expressed it, "we are often curious, but not really interested in what workers think."

A compromise between accepting and not accepting the changed philosophy is seen in paternalistic managements, which are far more numerous than is generally supposed. The essence of paternalism is that the management recognizes worker opinions and objectives, but exercises the right to determine what those opinions and objectives should be. Such managements know what is good for the workers better than the workers themselves. In the words of one influential executive, "Workers are all like children." Managements exhibiting this point of view have no need for the tools by which basic employee attitudes are discovered.

A second major obstacle to the use of devices for upward communication lies in the fact that such techniques are essentially evaluative instruments. In measuring employee attitudes, management is in reality checking on the quality of supervision and on the effectiveness of the sum total of its personnel activities. This evaluation process, no matter how cooperative the persons checked may be, inevitably introduces tension and concern on the part of subordinates. The sharper the evaluation method used, the less chance there is to throw up a smokescreen or otherwise circumvent a true measurement. The very reliability of the methods used generates a distaste for the techniques among those whom they are best designed to serve.

The emotional aspects of the evaluation process, often overlooked, can lead to non-cooperation and to rejection of the results. It is often hard to face one's shortcomings, and harder still to have them presented so concretely to one's superiors. And for management to invite the anonymous expressions of worker opinion in an attitude survey is to avoid the normal channel of communication between workers and management—the worker's immediate supervisor. Unless this problem is adequately handled, the antagonism of the supervisor is certain.

The evaluation process thus has a dual meaning for management. The evaluation data are required for undergirding decisions with sound judgment, but at the same time the data also expose various levels of management to the uncomfortable necessity of facing their own deficiencies. The execution of an attitude survey, moreover, conveys an implicit promise to do something about unsatisfactory conditions. Management men reflect a hesitancy to meet this implication by such frequently-heard statements as, "Why stir up trouble?" "Let sleeping dogs lie," or "Let's not put any ideas into the workers' heads."

The third obstacle which limits the use of upward communication channels is the inherent complexity which surrounds their use. The success of attitude surveys, for example, requires a thorough knowledge of statistical methods, and a wide acquaintance with the specific skills for avoiding those pitfalls into which the inexperienced inevitably stumble. All too frequent is the tragedy of worker morale damaged by ineptly conducted attitude surveys. Management often does not have available personnel with the training and experience necessary for using these techniques.

Administrative problems are also involved in the successful execution of

particular methods for discovering worker opinion. The selection of devices to be used, the appraisal of costs as related to benefits received, the frequency with which the methods will be employed, the strength of top management support, the corrective actions to be taken, the effect of the maneuver on the management's relations with the union, are examples of administrative decisions which are fully as important as knowledge of methods. The difficult nature of these decisions may in part explain the hesitancy of executives to make fuller use of the newer techniques.

A Challenging Task

The great wave of "scientific management" which has washed across our industrial frontiers since the early 1900's manifested itself first in the impersonal elements of tool and job, and more recently in greater efforts to understand the worker himself. A vast and virtually untapped wealth of practical understanding about people is available now to forward-looking managements. The human sciences—psychology, sociology, and applied anthropology with its related fields—are providing insights as well as tools for the more effective management of men.

The importance of listening to employees has been well stated in a leading company publication as follows:

> Attentive, patient, non-paternalistic and open-minded listening—free from self-consciousness and class distinction—is the biggest single factor in leadership. It is also our most important means of getting acquainted, keeping acquainted, and building the kind of employee relations we are all striving for.[6]

To know what employees are thinking and how they feel about their jobs provides one of the greatest challenges to modern personnel management. The tools of science with which to meet this challenge are well developed and generally available.

6. Ralph L. Lee, *Man-to-Man on the Job*, General Motors Corporation, 1943, p. 93.

I was figuring on starting some kind of business, but most every business is already engaged in more than's necessary; and then I ain't got no business ability. What I want is something that don't call for no kind of ability whatsoever and no kind of exertion to speak of, and ain't out of town, and pays good, and has a future.

UNKNOWN.

MICHIGAN AND POINT FOUR

*By JOHN M. HUNTER**

The position of world leadership forced on the United States by World War II and subsequent events has required more concern than ever before with matters of foreign policy. A major issue is Point Four, one that deeply concerns us both as Americans and as Michiganders. Our democratic way requires that we aid in making the final decision regarding Point Four's future, and Michigan's interest in the program is discussed below in order to provide a better background for our ultimate decision.

The Background of Point Four

In order to understand why this program concerns us, let us examine the extent of underdevelopment in the world, and find out what it means to be underdeveloped, why nations seek development, and what is the present status of international developmental aid. Table I emphasizes the differences between fortunate and unfortunate nations.

In making these comparisons, it should be noted that here in the United States, and especially in Michigan, our standard of living is better than is indicated in the column, "Developed Countries." It was estimated, for example, that per capita income in Michigan in 1951 was $1,734. Only eight states had an appreciably higher average, and the national average was $1,584.[1] This was more than three times as great as average per capita incomes in the developed countries as a whole.

Try to imagine what our lives would be like if we lived in an underdeveloped area. Incomes would only be one-fortieth as large as the ones to which we are accustomed. As individuals we would have no automobiles,

[1] *Survey of Current Business*, August, 1952, p. 17.

Table I

COMPARATIVE WELFARE DATA*

Characteristic	Underdeveloped Countries	Intermediate Countries	Developed Countries
Annual per capita income	$41	$154	$461
Mechanical energy, horse power per capita per day	1.2	6.4	26.6
Life expectancy in years	30	52	63
Physicians per 1,000 population	.17	.78	1.06
Food consumption, calories per day	2150	2760	3040
Cloth consumption, lbs. per person per year	4.8	7.52	18.63
Percentage of population literate	22	80	95
Elementary school teachers per 1,000 population	1.76	3.42	3.98

*Source: Stanley Andrews, "The U. S. and the Underdeveloped Areas," Department of State *Bulletin*. February 23, 1953, p. 307.

*Dr. Hunter is Assistant Professor of Economics, Michigan State College.

no electrical gadgets requiring motors, probably no power tools, and only infrequent access to (or use for) mechanical transportation. About one-seventh as many doctors as we now have would be available to care for us. A baby could be expected to live less than half as long as one of our own children. Four out of five people around us would be able neither to read nor to write. Our caloric intake would be only about a third less, but protein, vitamin and mineral intake would be seriously deficient. And the wonderful variety of foods we enjoy would be almost totally absent. Finally, the incidence rates of malaria, tuberculosis, intestinal parasites and nutritional diseases would be extremely high. Table II, for example, compares death rates from selected diseases in El Salvador in 1948 and the United States in 1949.

Table II

DEATH PER 100,000 POPULATION IN THE UNITED STATES AND EL SALVADOR*

Diseases	Death Rates El Salvador (1948)	United States (1949)
Diarrhoea and enteritis	279.9	5.6
Dysentery	7.2	.6
Pneumonia, influenza, broncho-pneumonia, and bronchitis	148.4	43.1
Malaria	133.2	.1

*Sources: *Statistical Abstract of the United States, 1949*, p. 73; Department of Social Affairs. *Preliminary Report on the World Social Situation*, (New York, United Nations, 1952), p. 29.

It is difficult to put ourselves in these circumstances, but this brief recital of general characteristics gives strong indication of the economic situations which confront Point Four.

Table III indicates the geographic location and population of the underdeveloped areas as defined by the International Development Advisory Board. For the obvious reason that Point Four cannot currently operate in communist dominated areas but only in non-communist or disputed ones, principal concern is with the two latter groups. The importance of this mass of people is obvious. This billion of human beings constitutes more than one-third of the world's population: it is roughly six times the population of the United States, and it is about 34 per cent greater than the total now living under complete or partial Soviet control. Such a group, united only in the sense that there is considerable ferment and urgency about improving the lot of all the people composing it, is a force worthy of considerable attention in a divided world.

It is clear that there is a great deal of room for improving the economic lot of these peoples, that is, improving the situation as set forth in the welfare indicators surveyed above. This is the understandable objective of the underdeveloped. It is equally apparent that substantial changes of the nature envisaged come about only as a part of evolutionary historical processes. Startling results cannot be expected in very short periods.

Table III

THE UNDERDEVELOPED AREAS*

Region	*Population*
Latin America	158,000,000
Africa	198,000,000
Turkey and Greece	27,000,000
Middle East	36,000,000
South Asia	465,000,000
Southeast Asia	188,000,000
Oceania	3,000,000
	1,075,000,000

Source: International Development Advisory Board, *Partners in Progress* (Washington, Government Printing Office, 1951), p. 5.

Toward a Possible Solution

Origin of the Point Four Program. The Point Four program was originally introduced in the President's inaugural address in 1949:

> Fourth, we must embark on a bold new program for making the benefits of our scientific advances and industrial progress available for the improvement and growth of underdeveloped areas. . . . I believe that we should make available to peace-loving peoples the benefits of our store of technical knowledge in order to help them realize their aspirations for a better life. . . .Our aim should be to help the free peoples of the world, through their own efforts, to produce more food, more clothing, more materials for housing, and more mechanical power to lighten their burdens. . . .

This part of the address gave a name to the program and set the tenor of its development. As President Truman envisaged it, it was to be an effort to help the poverty-stricken help themselves. The program was to be relatively inexpensive because it was not expected to be a massive give-away of exports, but rather an export of techniques and skills. It was not to be imperialistic in nature but a voluntary effort of the United States to improve living conditions in countries requesting our assistance. In some respects, it is one of the most adventurous educational experiments of all time.

Achievement. It is difficult to measure the global accomplishments of Point Four in the three years it has been operating. One reads with considerable satisfaction of notable individual achievements;[2] on the other hand there have been embarrassing failures.[3] The program has been relatively inexpensive, as planned. In the three fiscal years since it was approved about $340 million have been appropriated—just a little over $2 per American. This is less than one per cent of the total of $41 billion spent in postwar foreign aid. The principle of helping them to help themselves has been consistently maintained. Usually recipient countries have contributed two to three times as much as we have. Two basic techniques of imparting technical assistance have been employed. First, we have sent experts abroad. In September 1952 there were nearly 1,400 of them, of whom nearly a third were agricultural specialists. On the other hand, numerous professional people, technicians, and skilled workers have been brought from the underdeveloped countries to the United States for training. In September 1952 there were 810 such persons studying in the United States, and here again the largest single group was interested in agriculture. Point Four projects were in operation in the same month in

[2]E.g., *Point Four Pioneers,* Department of State Economic Cooperation Series 28 (Washington, Government Printing Office, 1951).

[3]E.g., Albion Ross, "Syria Aloof to Offer of $10,000,000 Aid," *New York Times,* October 23, 1952.

thirty-five of the authorized thirty-eight countries.[4]

Operating Principles. There are eight guiding principles under which the Technical Cooperation Administration administers the Point Four program. These are summarized below because they reveal much about the philosophy of the program and its administrators.

1. Fundamentally, the program is educational in character, but supplies and equipment are included whenever necessary to insure substantial results in each project undertaken.

2. Because populations in underdeveloped countries are hungry, ill, and illiterate, the major and initial effort of Point Four is to increase food production. Improving health and increasing literacy are considered next in importance.

3. The programs must be truly cooperative in nature: projects devised by, run by, and financed solely by the United States are likely to be resented and unlikely to succeed.

4. Point Four technicians work directly with the people they seek to aid, helping them to take the steps forward that they are ready to take. Many times only small steps are possible initially.

5. This is a self-help program, both for participating governments and for individuals. In general, the only thing given free is advice.

6. Whenever practical the program is carried out through the United Nations, its specialized agencies, or the Organization of American States. This international complexion makes assistance more palatable and less suspect to potential recipients.

7. Maximum use of manpower, area knowledge and special skills is sought by utilizing personnel of various private institutions, including colleges, business concerns, foundations and religious organizations.

8. It is the purpose and policy of the Technical Cooperation Administration to facilitate and encourage private foreign investment by making opportunities known, and especially by helping to create that political and economic stability which will make investment abroad attractive.[5]

What Has This To Do With Michigan?

The general nature of the problem of underdeveloped areas and the provisions of the Point Four program have been examined; it remains now to look into the objectives of Point Four and their relationships to citizens of our own state.

Humanitarianism. For people who consistently give money to charity or to support missionaries the purely humanitarian aspects of the Point Four ideas are appealing. Surely the picture of a youngster being raised on $41 a year would tug at the heartstrings, if not the purse strings, of nearly all of us. In addition to material benefits, we might

[4] *Point Four Fact Sheet No. 1*, Technical Cooperation Administration, Department of State, October 22, 1952. In citing these figures, I do not mean to imply that they represent a measure of success or efficiency. They could simply measure the size of a boondoggle. In my opinion, it is as yet much too soon to try to measure the success of the program quantitatively, and it is doubtful whether meaningful quantitative measurements will ever be possible.

[5] Summarized from a portion of the statement of Jonathan B. Bingham, Acting Administrator, TCA, before the Committee on Foreign Affairs, House of Representatives.

also hope to bring into his life some semblance of our American philosophy of the worth of the individual. For some people these reasons may be sufficient justification for supporting the program. For others, it is fortunate that the humanitarian objectives coincide with hardheaded "practical" objectives.

Michigan's Exporters. A recent study has indicated that Michigan's exports may account for as much as one-seventh of the state's total employment and income.[6] The state's export industries and all those connected with them will clearly benefit from the nation's participation in the Point Four program. Developing nations will need agricultural implements, transportation equipment, medicines, machine tools, etc. Even if the funds used to make these purchases are gifts of the government or loans from the Export-Import Bank or private investors, Michigan export firms and laborers and investors associated with them will benefit. This effect may be only temporary, but if some means is found to increase productivity and consequently purchasing power in the underdeveloped countries, they will consistently be able to buy more and more from abroad. In short, our export markets will be permanently expanded, creating higher wages, more jobs, and better returns to investors than would otherwise be the case in our very important export industries.

This is not to deny that individual exporting firms might sooner or later run into trouble. To some extent the underdeveloped areas associate "development" with "industrialization", and to the extent they are successful in industrializing some exporters may find new competition and even new trade barriers facing them. Cuba, for example, may decide to produce shoes which it previously imported, and the New England shoe manufacturer may lose a previously held market. However, the shoe manufacturing equipment will probably be imported, and the manufacturer of that equipment will find a market he never had before. Furthermore, the funds previously used to buy shoes may now be used by the Cubans to buy automobiles. If income in general is increased in Cuba through this process, we would expect that her imports would increase, although a particular exporting firm might experience difficulty. Evidence for this conclusion is found not only in the logic above, but also in historical data which indicate that the bulk of the world's trade takes place between relatively rich, industrialized countries.

Michigan's Consumers. A part of the objective of Point Four is to provide better and cheaper sources of raw materials. Virtually all of our natural rubber, manganese, chromium and tin, as well as a quarter of our zinc and copper, and a third or more of our lead and aluminum come from foreign countries, mostly from the underdeveloped areas. These items and many others of our chief imports are important in the production of civilian as well as defense goods. If we can find a way to increase productivity in the underdeveloped raw material producing areas, this would mean a cheaper and more abundant supply of imports. For Michigan consumers there would be the likelihood of lower prices for goods containing imports: an automo-

[6]John M. Hunter and Donald A. Moore, *Michigan and Foreign Trade,* Citizenship Education Series No. 1, Governmental Research Bureau, Michigan State College, 1953, p. 7.

bile, for example, is said to contain 300 imported items.[7] This aspect is especially important in view of our own dwindling supplies of certain important raw materials.

The Michigan Investor. The Point Four program relies heavily on private investment abroad by United States citizens and firms. In the past quarter century the climate for foreign investment has been poor and the incentives low. Consequently, foreign investment has been small. It is hoped that through a variety of means, such as investment treaties, this situation can be improved. If this aspect of the program proves successful, Michigan investors will have new and profitable investment opportunities available to them.

The Anti-Soviet Objective. If humanitarian motivations are not compelling and the more selfish ones of trade and investing fail to convince, still it is clear that each of us has a vital concern with the military-political objectives of Point Four.

We cannot afford to ignore the ferment and revolution in the underdeveloped areas in the world. By a number of events they have been awakened and are struggling to cast aside the shackles of economic poverty and all that goes with it. During the decade of the thirties these countries suffered much more severely from the depression than did the United States. Then contact with thousands of G.I.'s during World War II suggested the possibilities of a better life to people who had previously scarcely heard of this nation, much less seen evidence of our almost overwhelmingly high standard of living. And the success of the U.S.S.R. in increasing output has convinced people in underdeveloped areas that it is possible for a poverty-stricken nation to improve its position, although it is likely that they may have received a somewhat distorted view as to the nature of the Russian success and its costs. The revolution is active in many parts of the world, and we must acknowledge the fact.

The political objective of Point Four is to prevent the underprivileged countries from turning to Communism for succor. Their doing so would be disastrous to the free world because of the loss of strategic raw materials and important markets and because of their geographic locations and military strengths.

In one sense, at least, the Communists have a big advantage in wooing the underdeveloped peoples. They can promise all sorts of reforms and improvements if the political and economic domination of communism is accepted. Once the philosophies of the police state are accepted, however, these same promises need not (and in many cases could not) be kept. And we must remember that the costs of accepting communism are not as great for the underdeveloped as they would be for us. Those people now enjoy few of our cherished freedoms; so bolting to the Communist camp would in many cases only involve exchanging one oligarchic, despotic ruling group for another. In some circumstances almost any change will seem desirable; unfortunately changes once made are sometimes irrevocable.

The Point Four idea, on the other hand, can make no glittering promises of rapid improvement. It usually has

[7]Richard B. Frost, "Michigan—The World Trade State," *Inside Michigan,* (Vol. 1, No. 4), October, 1951, p. 35.

to work within existing social, economic, and political structures. We cannot grant to Ruritania Point Four aid contingent upon a change to a form of government more to our liking, or the removal from office of an official unfriendly to the United States, without the serious charge of imperialism being raised both by our friends and our enemies. These are not true democratic procedures anyway. But Point Four does offer a program of improved conditions through hard work, education, and careful planning over a long period of time. These promises are much more realistic than those offered by communism, but at the same time they are not so appealing.

"They Are Our Concern"

James Michener, writing a sequel to *Tales of the South Pacific,* tells of conversations with numerous Australians who felt quite certain that unless drastic policies were adopted, underpopulated, underdeveloped Australia would fall under Oriental domination in the next quarter century through the loss of New Guinea. He concludes:

> These islands, Australia, New Guinea, New Zealand, are our concern. When they are lost, the Pacific is lost, and when that mighty ocean is lost, much of our way of life is gone.[8]

This forecast makes quite clear the nature and urgency of the problem facing us. Barbara Ward Jackson, speaking especially of the situation in Asia, summed it up dramatically when she said, "This is a problem we must do something about, or it will do something about us." Asia presents probably the most urgent problem, but it is by no means the only one. Michigan citizens are part of the most powerful country in the world, one which cannot turn its back upon its responsibilities. We are in a position to be specially concerned with the urgency of these world-wide problems. Our own stake in the Point Four program is a large one.

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[8]James Michener, *Return to Paradise,* (New York, Bantam Books, Inc., 1952), pp. 453-454.

Pension Plans – An Accountant's Viewpoint

*By JAMES D. EDWARDS**

Of recent years, pension plans have become of greater and greater importance to business concerns. To be sure, they are not new, but the last decade has witnessed a vast increase in their number and scope: 17,018 have been initiated since 1942, while in 1952 alone 1,222 new plans were approved by the Bureau of Internal Revenue.

The freezing of wages had much to do with the urge to set up such programs. Labor unions had hesitated to push the issue of pensions, as the union leaders were concentrating on obtaining higher wages for membership. Labor could take care of its own future security, granted the proper wages: such was the claim. However, when wages were frozen, efforts were shifted to obtaining fringe benefits, a major one being pensions. In 1948 the Seventh Circuit Court of Appeals decision upheld the National Labor Relations Board's view that pensions were a proper subject of collective bargaining, as being a "condition of employment."

Actually, the first industrial pensions in this country were set up about seventy-five or eighty years ago in the railroad industry. Public utilities and a few manufacturing concerns followed suit in later years, but no appreciable progress was made until the federal government provided incentives for pension plans in 1928 by allowing for such cost to be deducted for income tax purposes over a ten year period. The real upsurge came after the Revenue Act of 1942, which clarified the status of pension funds and company contributions under Federal income taxes. The amendment allows the firm to take the full amount of current pension contributions plus 10 per cent of the unfunded liability created when the plan was established as a deduction for federal income tax purposes, provided that the plan is permanent and non-discriminatory.

Alternative Pension Programs

The pension problems of private business are not only matters of labor relations and the mechanics of accounting and administration, but are also fundamental, in that very sizable amounts of money are involved. Thus, before instituting a pension program all alternative plans should be appraised. In selecting a pension program there are also many long-term difficulties to overcome such as the cost of the liability arising from the program over the long run.

Most of the new plans are non-contributory: the employee does not pay any of the cost. The advantages of the contributory plan to the workers are: (1) the plan is usually funded and more stable; (2) benefits are larger, hence more adequate; (3) the employee is made conscious of the cost of the pension program; (4) the worker has a vested legal right to a portion of the accumulated fund.

The arguments against the contributory plan are as follows: (1) it is not always possible to obtain consent to participate; the government requires that 80 per cent of those eligible must be covered. What is to be done, more-

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over, about the other 20 per cent? (2) Less take-home pay for the employees may lead to additional wage demands. (3) From the standpoint of the firm the vesting provision tends to reduce the effectiveness of a pension program in cutting down employee turnover.

There are five general methods of funding a pension program. Although there is a large number of variations or combinations to select from, these can usually be grouped under the five major classifications. The individual firm has to make its decision on a basis of its own needs, since a pension program ought to be tailor-made to fit the requirements of the enterprise. Briefly, the five general alternatives can be described as follows:

1. Group Annuity: a single premium deferred annuity is purchased for each employee on a group basis.
2. Individual Retirement Annuity: a separate policy is purchased in the name of each employee.
3. Group Permanent Plan: a combination of group life insurance and group annuity in a single contract.
4. Self Administration Plan: a trust is usually set up supported by contributions from the firm. Pensions are either paid directly from the fund or annuities purchased at time of retirement.
5. Profit-Sharing Plan with Pension Features: this is usually a trust formation supported by a certain portion of the firm's profits.

There are many advantages and disadvantages to each of the above-described methods, with much depending on the size of the individual firm. The most popular plan in terms of employees covered is the self-administered type; this is mainly used by the larger enterprises. In respect to the number of plans in operation the individual policy is the most numerous.

Self-Insurance Plan. The larger firms tend to use the self-insurance programs. Only large firms can afford to use such a plan because of the amount of money involved. Smaller ones do not have sufficient working capital to carry such a program, and thus they tend to rely on the purchase of individual annuities for each employee. This is much more economical in such cases, since the annual premiums are relatively low while the amount necessary for self-financing would be too heavy a burden for the average small firm. The size of the enterprise affects the type of plan selected for financing a pension program.

The long run financing is a very important consideration since the pension program, unlike the usual financial operation, may run for an extended period of time. Care must be taken to base the firm's contributions not only on normal business conditions but also on normal tax rates. A plan established under bullish conditions and under an excess profit tax may well prove ruinous to the enterprise under normal or recessive conditions. Some plans, such as the individual annuity, require definite payments each year in order for the contract to remain in effect, while others, such as the group annuity, usually allow for non-payment or reduction of premiums in periods of low or non-existent profits. A group policy usually increases in cost as the age of the employees rises while the individual policy is usually based on a set premium each year. Annual fixed charges are a very important aspect of the operation of an enterprise; they are especially important in cases involving a pension program.

While pension programs have been in the limelight in recent years, it is

interesting to note that only a small percentage of firms and employees are covered by such programs, and the majority of the firms using them are the larger industrial organizations. Proper attention should be given, before making a decision, to the self-administered type of program. This program would, in most instances, be designed to meet the needs of an individual firm, while information pertaining to the annuity type of plan can be readily obtained from any insurance company.

Self-Administered Plan. When the self-administered program is used, especially in the larger industrial enterprise, the firm prefers to rely on its own financing program by organizing a trust into which the contributions of the firm are channeled. The earnings from the trust fund can reduce the contributions required yearly, thereby reducing the drain on current working capital. Then too, with a qualified plan, the entire earnings of the fund may be non-taxable under the Internal Revenue Act. Payments may be made directly out of the trust fund or the employees' share may be used to purchase annuities to provide the pension benefits.

It would seem necessary to consult with a group of experts, including actuaries to present figures on accumulation of funds, accountants to estimate cost and prepare statements, lawyers to interpret the laws and regulations, financial representatives to advise on the annuity programs. The assistance of these individuals is useful at all stages of planning, inception and administration.

Who is to be included in the program, and when? What is the scope of coverage and amount of pension? What is the vested interest of the employee? Many such problems confront a firm installing a pension program. The labor-management relationship will largely govern the answers to such points. A large number of the pension programs are established to supplement the Social Security Program.

The Effect of Federal Taxation

As previously mentioned, the impact of federal legislation on pension programs has been great. The regulations, while quite strict and complex, are nevertheless of very definite advantage to the firm. Liberal income tax exemptions have been granted to private industry. The government, being concerned with the welfare of the economy as a whole, has set up regulations to insure that the plans will not be instituted for a few high-salaried or specially favored personnel, but will be for the benefit of the worker. Section 165 (a) of the Internal Revenue Code has been set up to implement this purpose. It requires, first, that the plan be a trust or a permanent program for a definite period of time. Secondly, the plan must be for the exclusive benefit of the employees or their beneficiaries. Next the funds must be set up in such a manner that they cannot be diverted from the original benefits for any other purpose. This prevents the firm from paying the money into the fund, receiving its tax exemption, and then withdrawing the untaxed funds for other purposes. Even if there has been an overpayment the fund cannot be withdrawn. Further, the program must cover a certain minimum of personnel and must not discriminate in favor of officers, supervisory personnel or highly-paid employees. To qualify a plan, the firm submits it to the Federal Bureau of Internal Revenue, and if it is approved a ruling to that

effect is handed down and the tax exemption is granted.

The amount of the employer's tax-deductible annual contribution to the pension fund must be considered. In the absence of a formal program, any cash payments made directly to an employee upon retirement are usually deductible, as are payments made into a qualified trust. To prevent a business from making large contributions to the pension fund in a few years of high earnings, a limit was placed on the amount which is deductible for income tax purposes. This limit is 5% of the wages paid or accrued to each employee in any one year. The exception to this minimum is the profit-sharing type of program. Under this plan the maximum amount is set at 15% of the employee's annual wages.

These liberal deductions have proved a strong incentive for setting up pension programs. First of all the firm recognizes the economic significance of pensions; secondly, labor has taken a strong stand in their favor; and thirdly, the individual firm recognizes the competitive advantages and good will created by such a program.

The Accounting Viewpoint

From the accountant's viewpoint, a pension program is extremely complex and far-reaching. Planning has to be carried out with reference to past and present operations. Moreover, the plan will affect not only present considerations, but also the future success of the firm. The accounting department can render a real service to management by constructing exhibits which take into consideration possible changes in the cost of the program due to the increasing age of the employees, or a possible decrease in company earnings, so that the ultimate impact of the plan can be visualized before it is adopted.

Once the plan has been put into operation the accountant has two major problems to consider; first, the treatment of the past service costs and secondly, the handling of the current cost. In respect to the former, the accountant's action will depend upon which one of the following approaches has been utilized by the firm:

1. Recognition of past service at a reduced percentage;
2. Limitation of the number of years of past services to be recognized;
3. Establishment of a maximum pension;
4. Ignoring of past service costs, and treatment of present retirements on an individual basis.

Normally, the firm will not choose to ignore past service costs but will usually select one of the first two alternatives. Since the amount may be very sizable, the accountant is confronted with the problem of how to account for this sum. The American Institute of Accountants recommends that the past service cost not be charged against earned surplus-retained earnings. In Accounting Research Bulletin Number 36, November, 1948, it was the opinion of the Institute that such cost should be allocated to present and future periods as charges against income. This is also the attitude of the Internal Revenue Department, which allows a firm to charge off the costs against income over a ten year period. Past service costs are recognized as a proper charge against present and future income on the assumption that the benefits will accrue in the present and future and were not involved in the past.

In regard to current costs there is little, if any, problem. Once the amount of the contribution has been determined it is merely a question of charging the correct amount against income. Although the actual accounting involved is not particularly difficult, the accountant does play an important role. A large number of forms and records must be maintained and this task usually falls to the accounting department. Great care must be exercised to see that the records are accurate, since inaccurate records can cause much confusion in the administration of such a program. In addition to the records required by the firm itself, the accountant also has to prepare numerous statements and reports to accompany income tax returns. The returns must include such forms as schedules of wages paid to the twenty-five highest-paid employees, a schedule of employees covered under the program, a balance sheet of the trust, and a statement of the payments made and justifications of deductions claimed therefor. For the most part the accountant is more concerned with records, reports and statements than he is with the actual accounting for contributions.

Administration of Pensions

From a managerial viewpoint the pension program can be a great asset; then again, by its very nature, it can have quite unfavorable effects upon the company. The advantages are not at all hard to discern. Morale is raised when the employee knows that his future is at least partially secure and that when his productivity comes to an end he will have something set aside. Important competitive aspects are also involved. A liberal pension program can be a very important factor in attracting the most capable young men. Moreover, a pension plan tends to retard the turnover of labor, thereby reducing the cost of the training program.

These factors, as well as the social consciousness of recent years, have removed old age pensions from the category of charity and established them as a generally accepted operating policy of commerce and industry.

Business is really more agreeable than pleasure; it interests the whole mind, the aggregate nature of man, more continuously and more deeply. But it does not look as if it did.

WALTER BAGEHOT: *The English Constitution,* 1867.

A MEMO TO INDUSTRY

*By KENNETH WILSON and EDWARD A. BRAND**

Not many years ago, 36 to be exact, a survey of the 50 top business leaders in the United States revealed that three had attended college and none had graduated. Business administration was definitely not a well established or popular course of study. Schools were slow to add to the old academic scholastic training. In this respect schoolmen were no different from people in general in that they resisted change. Since then the demand for business training at the college level has caused a very drastic change in the offerings of colleges and universities: almost every school today has a business curriculum.

This change in the offering of business courses has had a very marked effect on the number of college graduates in business positions. A survey made in 1947, thirty years after the first study, showed that of the top 50 business leaders only three were *not* college graduates. A remarkable change for such a short period of time. Business leaders who are college graduates know the benefits derived from a college education and are, therefore, eager to increase the number of college graduates in their ranks, particularly for their future executives. In fact, in a short period of 30 years a college degree became as necessary for promotion to executive training as a high school diploma was in 1917. Truly a remarkable accomplishment for free enterprise, an accomplishment possible only under free competition.

Lest we get carried away with the over-all statistics it must be pointed out that not all business enterprises are headed by college graduates. Furthermore, many successful business establishments are staffed entirely by non-college personnel. They resist change and perpetuate their non-college employee and executive situation. In fact, some business men would not intentionally hire a college graduate.

Retailers constituted one of the major business groups resisting change and were very hesitant to welcome college graduates to their executive ranks. The largest stores, the department store group, were the first of the retailers to visit college placement bureaus and arrange to hire college graduates for their executive training programs. Today most department store personnel directors are interested in college graduates, but give little heed to the curriculum followed or courses completed in college. In a sense this speaks well for the benefits of a college education, but it does not speak well for the professional aspects of a career in retailing. This added to the fact that most people think of retailing as being a clerk-type of job with little or no opportunities for professional careers, makes retailing as a career underrated by college faculties and students alike. The result is that not enough college graduates take positions in retailing; this leaves most retail organizations with too few college graduates to promote to executive positions in the years ahead. As competition gets keener in the years ahead and

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more competent and better trained executives are needed to meet that competition, many of these retail organizations are going to be handicapped.

One of the first, if not the first, retail groups to make a very real effort to assure its members a supply of trained college graduates and at the same time promote the professional status of its executives by setting up a specialized college curriculum is the National Association of Food Chains. A five-year contract was drawn up between the National Association of Food Chains and Michigan State College to assure an adequate period of time in which to initiate the program.

Starting the Program

How was such a college program created? In this instance the National Association of Food Chains selected a committee to contact approximately thirty of the outstanding colleges and universities in the country to discuss the idea of creating such an educational program and to determine the ability of any one institution to establish and operate it successfully. Food industry executives on this committee made personal visits to the campuses of the colleges and universities. Michigan State College was selected because of its unusual facilities for such an operation and its past record of achievement in establishing new curricula to meet the needs of important segments of industry.

A sound educational approach was taken in the actual setting up of the courses to comprise the program of study. Michigan State educators sat across the table from representatives of the food industry to discuss what should constitute a curriculum in food distribution. From a series of meetings of this type the curriculum was ultimately completed. The program was set within the framework of the School of Business and Public Service. Consequently, students at both the undergraduate and graduate levels receive their degrees in business administration with specialization in food distribution. In other words, a student upon completion of his Bachelor's degree has had the background of subjects you would typically expect a student of business to have. In addition, he has had an opportunity to study courses in horticulture, animal husbandry, dairy, and poultry to give him knowledge of fresh produce, meats, milk, butter, cheese, and poultry products. During his senior year he takes such courses as food merchandising, food store operation, and food chain administration. This results in a sound degree in business administration and at the same time points him toward, or opens a new avenue to, the field of food distribution.

Graduate students include both sponsored and non-sponsored students. Company-sponsored students are experienced men sent to Michigan State for graduate study by their employers. This provides an on-campus executive development program for the industry. Upon completion of their graduate programs these men return to their respective organizations. Approximately one-half of the graduate students are company-sponsored. Three $1000 fellowships have been set aside from funds received and are awarded each year to prospective graduate student candidates of unusual ability. These fellowships are administered by Michigan State College on a competitive basis.

Mutual Benefits

Let us consider some of the contributions that a program of this kind can make to the food industry and to students pursuing this curriculum. Students gain a practical appreciation of values, which will be reflected in their careers regardless of the phase of business they ultimately decide to make their specialty. A curriculum of this type permits a student to get actual work experience for college credit during a summer session. This same experience aids him in reaching a decision whether or not to pursue retailing as his career.

Comments have often been made to the effect that we need more expression of industry in our educational pattern. An in-training type of program certainly provides this opportunity. Representatives of the food business are invited into the classroom to present important phases of their operation. Current data for research projects are made available through contacts with the industry. Such cooperation through classroom visits and presentations by food executives tend to narrow, if not completely eliminate, the gap between education and industry.

Another important factor is the matter of specialization. This curriculum permits a man not only to gain an education in the general field of business, but also allows ample room for specialization with respect to food distribution.

One of the major goals in this curriculum is not merely the development and perfection of courses and subject materials, but rather, the development and perfection of men. A further goal is to stimulate a high degree of creative imagination within the students. New developments come from men who have imagination and the ability to formulate new ideas.

Such a curriculum presents an excellent opportunity for follow-up studies made to check the progress of those who have completed their training at Michigan State College. Not only do such studies tell us where our students have gone within the industry, but opportunity is also given to these men to suggest possible improvements in the curriculum after they have had a chance to apply some of the things which they were taught during their time spent on campus.

This cooperative project marks a new age of intercommunication and interchange of information between the food industry and education. It is clearly a way in which an industry can establish higher ideals, greater respect, and higher standards. An opportunity for continuing study and advancement in food distribution has been made possible through cooperation between Michigan State College and the National Association of Food Chains. This is one of the finest ways of telling America and our American youth what the nation's food industry stands for today and, at the same time, serves to assure a supply of trained college graduates for future executive positions.

BASIC CHEMICALS FROM MICHIGAN

*By RUEL C. KAHLER**

Look at your child's jigsaw map of the United States; you will see each state decorated with a little picture of some major industrial or agricultural activity. Cotton for Louisiana, cows for Wyoming—and inevitably a little car for Michigan. All of us are proud to have our state identified in people's minds with anything as epochmaking as the automobile, but do we ourselves tend to think of the industrial picture so simple-mindedly? Do we, too, see only a little car superimposed upon our private picture of Michigan? If so, it is time to find out something about the state's complex and fascinating industrial geography, and the present series of articles is designed to be helpful in this respect. Several of our major industries are too little known to many of us.

The very fact of the vast importance of the automotive industry means that there must be all sorts of subsidiary industries to provide it with the vast and varied materials it needs. It is the major employer in the state, as well, and the prosperity it affords us implies increased demands on the part of its employees. But quite apart from their service to the automobile manufacturers, major industries flourish among us in their own right. Not the least of these is the chemical industry with which the present article deals.

Why do we know so little about this major factor in our economy? For one thing, it is very new, in terms of its great importance. One might claim the chemical industry goes back as far as the first Chippewa who traded a bag of Michigan salt for a chert arrowhead, but this would be unrealistic. The Michigan chemical industry is as old as the state's industrial use of brine, which does not go back farther than seventy years, and its period of phenomenal growth is right now—it is growing like corn in July, as it is throughout the country. Pharmaceutical research, agricultural research, the demands of aviation for metal for jet engines; these are random examples of the tremendous pressures upon chemistry to find new products to satisfy our demands.

Not only is the industry unfamiliar to us because its giant growth is so recent, but it serves us so unobtrusively we are hardly aware of its presence. Michigan's chemical industry depends upon its salt supply, but we never see 96% of the salt we produce. Only 4% reaches our bag of groceries; the rest is a basic chemical for industrial use.

There is hardly a more fascinating study than the place of chemistry in every-day life. Why labor the point when our very socks came out of the test tube?

Michigan's Part in This Development

Let us look at the government's statistics on Chemicals and Allied Products for some hard facts on which to base our study. We are in seventh place in the value of chemical products. 32,000 people (1950 figures) make up our chemical payroll, and

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over 23,000 of these are production workers. The payroll is almost $130 million. Since 1950 this growth curve has not sagged; indeed the Korean War has called for an even greater expansion of facilities. The number of certificates of necessity granted in this state up to October 1952 indicates our rank in the defense effort. Only Texas and Louisiana, with their petrochemical expansion, outranked us in this respect. The total value of the expansion covered by our certificates was $150 million, and we had more plant expansion also in process. Our chemicals and allied products field has reached the point where it is the fifth in our industries, and very probably is the largest not primarily dependent upon the automobile industry.

Even the most impressive statistics fail to show the entire impact of the chemical industry on our national productive power. Without the output of the basic chemicals many of our modern manufacturing processes would be nonexistent, or much modified. Perhaps we have sufficiently indicated the scope of the field and can go into greater detail in a smaller segment of it. Our coverage is necessarily sketchy: a lifetime of effort would not be enough to trace the complete implication of chemical development in our social and economic structure.

Basic Chemicals Defined

As has been pointed out, Michigan's chemical history could almost be written in terms of our wood resources, our salt deposits and the scientific search for new uses for the by-products of brine. However, this statement is deceptively simple, for the utilization of salt can lead the industrial chemist into much pioneer research.

For this article, we are using the term *basic chemicals* to cover a larger field than is often intended. Within this term we are including the classification of *intermediate chemicals* when they are produced by companies manufacturing the basic chemicals: i.e. those processed for the manufacturer rather than the consumer. In other words, that 96% of Michigan's salt that does not reach your salt-shaker becomes, in our definition, a *basic chemical.* Some salt is incorporated in the manufacturing process direct from the brine well, while another part is marketed to other manufacturers.

History of Industrial Chemistry

Whether our approach to this topic is historical or geographical, we find the chemical industry woven inextricably into the fabric of our state's existence. A geographical picture of our mineral resources is useful, and it is simple indeed compared to a state like Arizona or Colorado, with their complex of minerals. Our Upper Peninsula is the home of the wood chemistry industry, while in the Lower Peninsula are two districts where our salt resources are utilized industrially.

An octogenarian could have witnessed almost the entire history of our chemical industry. In his childhood he would have seen the process of the evaporation of salt for table use in vats heated by slabs from our once mighty lumber mills of the Lower Peninsula. An ancient process, hardly even a chemical one, but soon this same technique was producing bromine. This process was made competitively possible for some time by the availability of cheap wood resources.

By the time that Dr. Herbert Dow arrived in Midland in the late 1880's, the little town had already become the

leading bromine producer in the country. Total output was small and not very profitable. The necessity of a better method of recovery was indicated, and Dow believed his "blowing out" process would fit the need. It was the abundance and chemical content of the brine at Midland that caused it to be chosen as the site of what is now one of the giants among the nation's chemical plants.

Downriver from Detroit things were happening also. J. B. Ford sank his first brine well at Wyandotte in 1891 and set about his preparations for the production of soda ash. His plant went into operation in the following year. Soon afterward the Pennsylvania Salt Manufacturing Company also began its Michigan operations at Wyandotte.

New industries do not spring up without problems, and the Michigan chemicals were no exception. Ready-made equipment was not handy. Nor was it easy to jump from laboratory experiment to large-scale operation in the plant. But one by one these pioneers worked out the kinks of their processes and gradually expanded their lines. Even with the crude equipment of the day, the persevering scientists and manufacturers continued to change both products and methods. These new products allowed more value to be extracted from the brine, more profits for the infant industry's expansion, and the ability to meet the competition of foreign producers who then furnished most of the chemicals used by American manufacturers.

Foreign producers, understandably, did not gaze with joy at the upstart American chemical industry, and Michigan companies were soon to play important roles in the battles of the American industry for its place in the sun, that is, in the markets of the world. Three incidents from the Dow company history illustrate the impact of Michigan producers on the world chemical market.*

The Dow company still was struggling to become firmly established when the English bleach manufacturers decided it was time to take action to hold the American bleach market for themselves. Bleach was a staple in Dow production and the loss of that market would have meant serious trouble for the firm. The English manufacturers formed a powerful combine to fight the American bleach producers and lowered their prices to force out the presumably weak American producers. Thus they hoped to maintain their dominance of the American market. Dow and others met the challenge and in the end the English relented and raised their prices to moderately profitable levels.

As if this were not enough, the company emerged from the bleach war only to get involved with the Germans over the sale of Dow bromine in the world market. Dow had seen opportunities for his company in the export of this chemical, but the German chemical industry dominated the foreign bromine markets, selling its product through a cartel arrangement. The Germans retaliated against Dow's foreign sales by penetrating the American market and dumping their product at drastically cut prices. Dow then concentrated on the European markets where after a bitter struggle he defeated them in their own back yard. Thus was established the right of American producers to sell abroad. Here, as in other instances, fortitude and business acumen

*For an interesting and more complete history of these events see M. Campbell and H. Hatton, *Herbert H. Dow*. Appleton-Century-Crofts, New York.

were instrumental in the establishment of a sound chemical industry in this country.

The last of these three skirmishes also involved the Germans who had almost sole control of the organic chemicals. American textile manufacturers relied on German sources for their dyes and no alternative source was available when the first World War broke out. With textiles caught in this predicament the American chemical manufacturers quickly began to adapt themselves. Dow, in his quests for new uses of brine derivatives, had already been working on organic chemicals and had concentrated his effort on the synthesis in indigo, one of the most important dyes. This research enabled him to become the first American producer of synthetic indigo, a product that utilized intermediate chemicals made from Michigan brine.

The last example illustrates also one of the most important factors in the growth of the Michigan industry. In the production of bromine other chemicals were left in the brine solution that held a potential profit to the industry. Such a situation would certainly stimulate either a chemist or a businessman to seek some use for these "wastes." Being *both* chemists and manufacturers the more enterprising pioneers of this industry showed amazing ability to develop new methods to extract these chemicals and to find new uses for them. Chlorine became an important industrial product recovered from the brine, magnesium was extracted, and sodium and calcium products were made available in commercial quantities.

In World War I the nation called on Michigan chemical producers for other products essential to the carrying out of the total war. Picric acid for explosives, TNT, deadly mustard gas, and bromides for photographical work and medicines are illustrative of the many products evolving from brine that became critical war needs fed by Michigan manufacturers.

Faced with overcapacity at the end of the war, Michigan companies looked for new brine uses. From their basic research evolved many of the plastics, insecticides, weed killers, and industrial chemicals that are extremely valuable today.

World War II accentuated the demand for chemicals and many civilian products were turned to military use. New protectives were required in the fight against the effects of the jungle climate, and basic chemicals were needed in greater volume to meet the heavier loads of industry. The effects of war production can easily be overrated. Much of the basic research for war uses had been a result of a rigorous research program established by the companies to meet the strong peacetime competition—a competition playing that recurring theme of new products, new methods, and new uses—a theme that has made this industry one of the most dynamic in Michigan, and in the nation. As a result probably no other Michigan industry has the diversified markets that are open to the chemical manufacturer.

Another interesting story is that of the upper peninsula industry utilizing wood as a resource for the manufacture of chemicals. The start of this industry is bound with the automobile industry. Early in the twenties the Ford Motor Company established a plant at Iron Mountain which ultimately became part of an integrated operation from forest to automobile bodies. Timber from Ford lands was used in the manufacture of station wagon

bodies. One phase of the operation was a sawmill. Wood waste from the sawmill and other wood not suitable for fabrication purposes was heated to produce several valuable chemicals such as wood alcohol and acetic acid. The chemical portion of this plant was taken over by the Kingsford Chemical Company after Ford closed the plant in 1951.

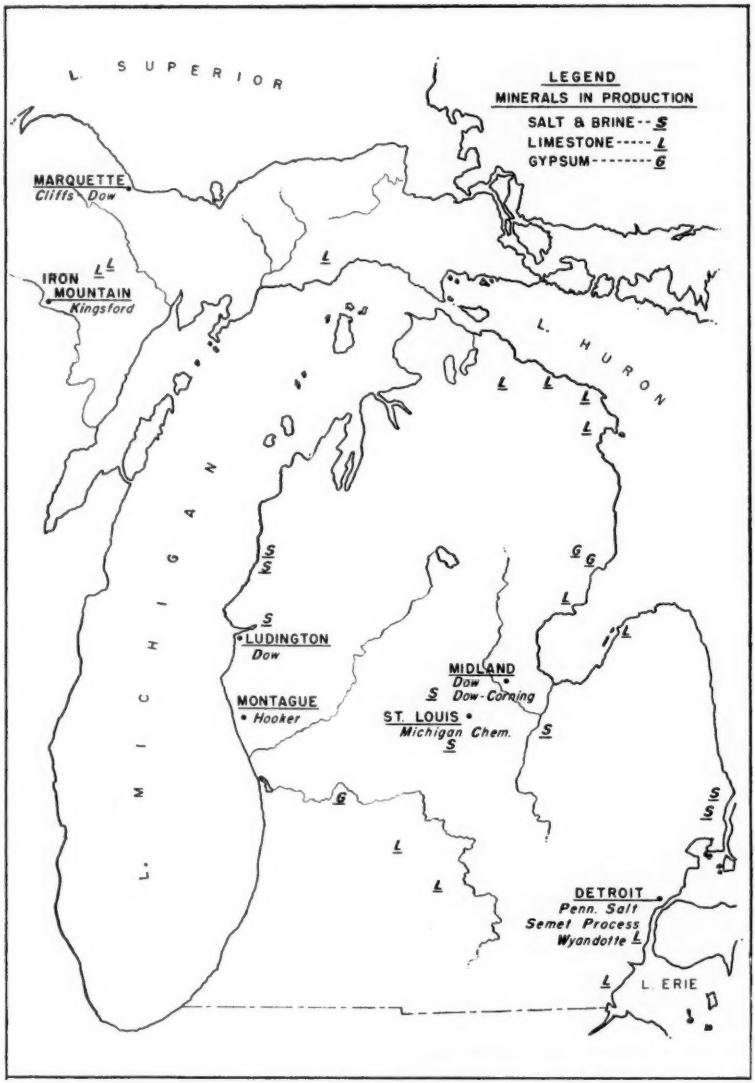
Places and Products

A glance at the map on page 28 will show you some of the locations where basic chemicals are produced in Michigan. Also, the map shows the major deposits of brine, limestone, and gypsum now in production. Looking closely, we find the Michigan basic chemicals from wood being made in the upper peninsula while the lower peninsula locations are based on salt and limestone. These lower peninsula companies are located in two areas: One is a belt across the central portion from Midland, near the east coast, to Ludington and Montague on the western coast. The other area is in Detroit and the downriver region (in the neighborhood of Wyandotte, River Rouge, and Trenton).

The Central Area. This area contains probably the most familiar name in Michigan chemicals, that of the Dow Chemical Company. This company, the fourth largest United States chemical producer, has its home office in Midland. Together with Dow-Corning which is jointly owned with the Corning Glass Company, Dow provides employment for about ten thousand in this city where the total population is scarcely over fifteen thousand. The fastest growing major chemical producer in the nation's most rapidly expanding industry, Dow has expanded its Michigan operations in Midland, Ludington, and Bay City. Over fifty-eight million dollars of the Dow expansion is covered by the previously mentioned certificates of necessity. From its central office at Midland Dow administers an enterprise scattered not only throughout the United States, but also as far away as Japan. While the foundations laid in Midland have carried the company to distant places, the Michigan operations still form the core of Dow production. The Midland plant alone is said to produce some six hundred products: certainly a variety little expected when the original bromine production began.

Operations of the company have been highly integrated. Expansion has taken place partly to secure the advantages of more complete use of by-products and partly to use the basic chemicals in the formation of other chemical products to diversify the markets served. A glance through a single issue of the *Dow Diamond,* a publication for Dow employees, reveals such diverse uses for Dow products as fruit, rubber, and wood preservatives; plastic fabrics and tiles; wallpaper paste; and dust control. Over half the production of the company is in industrial chemicals slated for use by other concerns. Plastics, agricultural chemicals, and fine chemicals like pharmaceuticals account for most of the remaining Michigan production.

Based primarily on brine, Dow has become the world's largest producer of chlorine, an important industrial chemical used in the treatment of water, bleaching operations, and the manufacture of intermediate chemicals such as phenol. This latter product is treated with benzene, (some of which is furnished by the Michigan petroleum fields,) to make aspirin and plastics.



LOCATION OF MICHIGAN'S BASIC CHEMICAL INDUSTRY

Cities and companies operating major plants are shown. Locations of the three principal natural resources are indicated by letters.

Limestone is an important resource at Ludington where the plant supplies raw materials for a government-owned magnesium plant in Ohio.

Just 25 miles southwest of Midland is another native Michigan chemical producer, the Michigan Chemical Corporation at St. Louis. Founded in 1935 to meet the needs of an expanding market for bromine and bromides, the company has since diversified by the addition of other bromides that have, in turn, carried the company into the field of organic chemistry. In 1944 the armed forces needed large quantities of a new insecticide called D.D.T. — and they wanted it in a hurry. Michigan Chemical was producing D.D.T. in tonnages by mid-July 1944 and continues an important producer of this insecticide.

Brine at St. Louis also yielded quantities of high-purity salt for use in canning and water softening. To market this product the company formed a subsidiary, the Michigan Salt Company. Early in 1942 Michigan Chemical constructed a magnesia plant to respond to the war needs for this critical metal which is developed from the brine.

Research efforts were centralized for Michigan Chemical Company in 1944 when a full-time research department was organized. The results of these efforts are indicated by the present list of products including agricultural and industrial insecticides, new magnesia products, and intermediate chemicals for pharmaceutical use in the manufacture of antihistamines, analgesics, and other products.

Recently the company has expanded its facilities at St. Louis and also purchased the plant and assets of the Rademacher Chemical Company at Manistee.

On the western coast we welcome the newest member of the Michigan chemical family. So young is this Montague plant of the Hooker Electrochemical Company (of Niagara Falls, New York) that it has not as yet begun production. Scheduled for completion late in 1953, the plant will be this national company's third large production plant, and its first in Michigan. An electrolytic process will produce chlorine, hydrogen, and caustic soda. Hydrogen can be used in the hardening and deodorizing of vegetable oils to make products like your vegetable shortening. The largest portion of the Montague production of caustic soda and chlorine will go to the Midwestern pulp and paper industry with the balance used for the oil refining and in the manufacture of rayon, dyes, soap, and other products. In the future the company plans to expand this plant by adding several new chemical products to its line.

The site of this twelve million dollar plant indicates the extent of salt deposits in our state. Two layers in the area provide an estimated one million tons of salt under each acre of land. The lower layer alone can supply the company needs for the next six hundred years.

Detroit Downriver Area. Along the Detroit River, for some fifteen miles downriver from the business heart of the city, stretches a complex industrial panorama. The massive plants of many industries are here, prominent among them the basic chemical plants. The fundamental reason for their locating here is the salt deposit underlying this area.

A little over fifteen years ago the operation of Michigan Alkali was described as a giant among chemical producers although it used only a simple

process, understandable to the layman. Today, the Wyandotte Chemicals Corporation, successor to Michigan Alkali, is gigantic, but its facilities and techniques have become far more complex. As a pioneer in the commercial production of plate glass, J. B. Ford knew the importance of soda ash. This was the one glass-making material America did not furnish in abundance and it was to meet this need that the Wyandotte plant was founded.

Wyandotte was an ideal location in several respects. The site itself provided salt sufficient for generations to come. Today, thanks to its dockside location, Wyandotte Chemicals uses its own fleet of ships to transport another primary resource, limestone, from its quarries at Alpena and coal from its mines in Pennsylvania. Another vital importance of water to their operation is indicated by the 110,000,000 gallons used daily for condensing and other purposes.

In the mid-30's the company began to intensify research activities in the belief that research is as important as sales, production, or finance. Backing up this conviction on June 7 of this year, Wyandotte Chemicals opened a brand new multi-million-dollar research laboratory to seek still more uses for its chemicals. Research is carried on in organics, inorganics, and product application by a staff of more than 200 people. Truly another indication of the spirit of Michigan chemical manufacturers in the promotion of a more comfortable living for us all.

Once, the company concentrated on soda ash, one of the most widely used industrial alkalies; but today the diversification program has brought them into many allied fields. Combining the chemicals produced from salt, limestone, and coal with petroleum products, Wyandotte entered the field of organic chemistry to make glycols which are the base for anti-freeze, and are used in making plastics, textiles, and inks. Another Wyandotte product, bicarbonate of soda, as a company pamphlet quips, stops both burps and bonfires. The company is also one of the nation's major producers of synthetic detergents, chlorine, and caustic soda.

Despite its name, the Pennsylvania Salt Manufacturing Company is a neighbor of Wyandotte Chemicals. Penn Salt is a Philadelphia-based company, but its largest operation is in Wyandotte. Back in the 1890's Penn Salt was producing basic chemicals from Michigan brine. Among its present products are chlorine, caustic soda, and ammonia. Ammonia, one of the basics we have not as yet discussed, finds its principal uses as a refrigerant, fertilizer, or as an intermediate for the making of other chemicals. The Michigan plant also processes its own chemicals to make cleaners, lye, and insecticides. During recent years Penn Salt has spent fifteen million dollars for the expansion of Michigan facilities, including almost four million for the production of chlorine alone.

Some of the other downriver plants are operated by subsidiaries of the Allied Chemical and Dye Corporation, one of the two largest chemical corporations in the United States: its Semet-Solvay, Solvay Process, and General Chemical Divisions. Among the basic chemicals that flow from this plant of the Solvay Process Division is soda ash, of which the division is the largest United States producer. The Semet-Solvay Division plant is devoted to a process of coking bituminous coal brought from the company mines in West Virginia. This process releases

highly valuable gases which are captured for further processing. The coke remaining has a high carbon content and many industrial uses. A by-product of the process is coal tar which, in turn, is processed in another Allied Division. Allied's General Chemical Division plant in Detroit produces acids and recently expanded its facilities for sulphuric acid, one of the most widely used of all commercial chemicals.

Upper Peninsula Plants—The destructive distillation of wood to form several chemicals has become an important factor in the economy of the Upper Peninsula. The Cliffs Dow and Kingsford companies together employ over eight hundred workers in a process utilizing cull hardwood. Many other jobs are created by this process for lumbermen in the U.P. woods.

Michigan's U.P. provides a good location combining nearness to the raw materials with a sufficiency of fresh water to be used in the condensing and other operations. Rail and truck hauling facilities are ample for gathering bulky wood raw material.

Marquette is the home of Cliffs Dow, of which Dow Chemical is the major owner. Here the company produces over 40,000 tons of charcoal annually. When we realize that much of the weight is lost by the distillation process we appreciate the great tonnage of wood needed to feed this process. Early methods of charcoal production allowed all the gases to escape, but later science found that they have important chemical components. In the large ovens at Marquette these gases are captured and processed to manufacture large quantities of acetic acid and methanol. This latter product is more commonly known as wood alcohol and is used in the production of dyes and drugs. The Cliffs Dow plant also makes formaldehyde, creosote and creosote oils, and sulfuric acid.

The Kingsford Chemical Company, as we saw, was formed to take over the chemical operations of the Ford plant at Iron Mountain. The Ford plant's employment of some 1,600 workers in its entire operation was a mainstay of that city's prosperity. When the plant closed, a crisis faced Iron Mountain, but timely efforts of local organizations and the Michigan Department of Economic Development brought together interested people who formed the new company to continue the chemical operations. The Kingsford Company's employment currently is about 430 workers. Its process and products are comparable to those of Cliffs Dow. Charcoal produced here is put into the form of briquettes and finds its use largely in the heating of trucks carrying perishables and railroad dining cars, as well as in the picnic grills with which we are so familiar. From a conservation standpoint it is notable that the timber used in the process is mainly sawmill and forest waste and cull lumber not suitable for construction purposes.

The major basic chemical industries in Michigan today have been described. We have not completely catalogued all plants producing any basic chemicals in our state: for example, in the huge Morton Salt plant at Manistee, definitely a salt-producing operation, there is some bromine output. However, in this survey you have learned the essentials of Michigan's basic chemical industry and what it is doing.

Tomorrow

Today as we gaze upon the basic chemical plants we see one of Michi-

gan's most vigorous and firmly established businesses. Its products are many, its operations characteristically large scale, its plants modern and growing. The basic chemical companies are important employers in their own rights. Further, they support employment in numerous auxiliary industries, like the molders of plastics for household or industry use. Also they employ many construction workers in their current plant and laboratory expansion programs; provide transportation employment on water, rail, and highway; and they make possible the large and steady employment in the hundreds of industries that use basic chemicals as a raw material.

But what of tomorrow: will basic chemicals then be thriving? Answer the question by glancing around your room: the chances are good that you will find many things whose presence was dependent on the production of basic chemicals. You will note plastics, dyes, and other synthetic materials in draperies, rugs, furniture coverings, accessories, and so on. Then consider the clothes you are wearing. Even the paints and metal products in your room could be made only with the use of basic chemicals.

When you further reflect that many of these represent relatively new uses of chemicals, you will agree that basic chemicals have been expanding their role in modern living at an amazing rate. If you could visit chemical manufacturers' research laboratories, you would see how scientists, spurred by competition, are planning many more surprises for you in the future. And, if you could study graphs showing how prices of new chemicals have been lowered, due to the triple forces of volume, efficiency, and competition, you would know that their consumption will expand. At this point even the most skeptical would be convinced that the *nation's* basic chemical industry will continue to grow mightily.

What, however, about the future of this industry *within* Michigan?

In terms of raw materials Michigan is set for years to come. Even with greatly expanded needs the salt deposits will be adequate for several hundred years. Limestone is found in abundant quantities. Fresh water in Michigan, the nation's "Water Wonderland," is a most important resource, abundantly available both for use in processing and as a highway for bulk transportation.

Petroleum production in the state is somewhat costly compared to other production points for use in plastics But there is a possibility for future use of Canadian oils to supplement the Michigan fields. The state's deposits of gypsum, of which Michigan is the Nation's top producer, may conceivably become even more important if the U. S. sulfur resources continue to decline.

Marketwise, the state is centrally located to serve both the Midwest and the Eastern markets. The strong competitive pressures along with the bulk and low unit values of the basic chemicals will increase the value of such a location from which the major markets are easily accessible. Good networks of highways and railroads supplemented by water transportation aid Michigan producers in reaching the more distant markets.

And, as a final index of the future we have the words of Arthur Little "Chemistry is a creative science, and the first chapter of its Book of Genesis is yet to be written."

TOWARD HIGHWAY SAFETY

When pondering the traffic toll on the highways, do you wonder what is being done about it?

Much is being done to train the oncoming generation of drivers. Nearly 400 of Michigan's 600 high schools now offer driving courses. Evidence conclusively shows that such training brings results, such as the recent Pennsylvania study of 3,000 high school graduates. Those who had driver education had only one-third as many accidents. Against this consider that only one in four Michigan high school students receives driver education. Why not every student?

There is no shortage of training cars, for auto dealers have been generous. There *is* an obstacle of cost (nearly $30 a student), but to thinking citizens the cost is small for the saving in lives and property. Also, a basic reason is the shortage of teachers who can competently train drivers.

Thanks to financing by automotive manufacturers and dealers and by insurance companies, the Michigan Interindustry Highway Safety Committee sponsors driver-training education in five state colleges. In this program Michigan State College trains annually 150 teachers from the state's high schools. The Allstate Foundation finances scholarships enabling 45 teachers to attend. Besides teacher training at East Lansing, MSC is helping the high schools locally. One aid, an effective film titled "The Weakest Link" was produced by the college this year for the Interindustry committee and is in nationwide demand.

Obviously not enough teen-agers are offered driving instruction, nor are adults, who are putting terrific demands on their local high schools. Two other types of drivers are being directly instructed by MSC. The College trains 750 school bus drivers each year in southern Michigan counties, a program financed by the State. As a quarter-million children ride buses to Michigan schools, this is of widespread benefit. Equally valuable are the year-round programs at MSC in cooperation with the Michigan Trucking Association which trains drivers and others for safe, efficient truck operation.

Education is just one of several branches of the College that are contributing to street and highway safety. Yes, much is being done, and Michigan State is duly proud of working with other agencies to achieve progress on the highway.

BUSINESS RESEARCH PUBLICATIONS

The Bureau of Business Research was established in 1951 to assist the Michigan State College faculty in conducting economic and business research, and to serve Michigan business with information and studies. Inquiries should be addressed to the Bureau's director. The studies are usually published, and those currently available are listed below.

RESEARCH REPORTS

(single copies free)

1. *Hastings Consumer Shopping Survey*
2. *The Great Lakes–St. Lawrence Seaway*
3. *Greater Muskegon Consumer Shopping Survey*
4. *St. Joseph Consumer Shopping Survey*
6. *The Travel Accommodations of Port Huron*
7. *Michigan Tourist Survey*

CONFERENCE REPORTS

(one dollar a copy)

1. *"Knowing and Interpreting Your Community" Conference*
2. *Joint Industry Conference on Packaging and Preservation*